



Discussion Paper

Deutsche Bundesbank
No 34/2025

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ISBN 978-3-98848-055-2

ISSN 2941-7503

Local Peer Effects and Corporate Investment*

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October 8th, 2025

Abstract

We examine peer effects in corporate finance by assessing how a firm's investment influences its neighboring peer firms' investment. To uncover the exogenous component of investment, we exploit time variation in the increases in state corporate income taxes across the United States and utilize heterogeneity in local peer firms' exposure to these tax increases to construct an instrumental variable. We identify a positive and robust causal effect of local peer firms' investment decisions on firm investment. Distinguishing between physical and intangible investment, we find that peer firms' investment in physical (intangible) capital only influences firm investment in the same type of capital, particularly when that capital is central to operations. Further evidence indicates that learning from peers is an important factor, as peer effects are more pronounced for firms with stronger learning motives.

Keywords: Corporate Investment, Peer Firm Effects, Corporate Income Tax, Agglomeration

JEL Classification: G0, G31, G38

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We are very thankful to Sonny Biswas, Casey Dougal, Florian Heider, Alexander Hillert, Jan Krahnen, Thomas Mosk, Klaus Schaeck and seminar participants at Capital University of Economics and Business, Goethe University, the University of Bristol and the University of Exeter. The views expressed are our own and do not reflect those of the Deutsche Bundesbank.

1 Introduction

Peer effects, the impact of a group’s behavior on individual behavior, are found to boost workplace productivity, foster human capital accumulation, contribute to economic development, and shape household financial decisions.¹ Examining interactions among firms, earlier work finds that a firm’s behavior is also heavily affected by the behavior of other firms and firm peer effects can help explain corporate decisions (Leary and Roberts, 2014; Foucault and Fresard, 2014; Kaustia and Rantala, 2015; Seo, 2021; Bustamante and Frésard, 2021).

In this paper, we focus on corporate investment and examine how firms’ investment decisions affect the investment of their neighboring peer firms. We analyze local peer effects not only on total capital investment but also study peer effects separately for physical and intangible capital investments. To identify the causal impact of firms’ investment on neighboring firms, we employ an instrumental variable estimation technique based on the staggered increases in state corporate income tax rates across the United States.

Economic theory provides mixed predictions regarding the direction of peer effects among firm investment decisions. On the one hand, the investment pattern of firms in an area may correlate positively as they learn from or mimic the investment behavior of their peers (Scharfstein and Stein, 1990; Bikhchandani et al., 1992; Foucault and Fresard, 2014). Localized networking among neighbors also helps facilitating the information exchanges and fosters the learning process (Arzaghi and Henderson, 2008; Engelberg et al., 2018). On the other hand, local firms compete for local input resources or compete in the product

¹For empirical evidence on the existence of peer effects among individuals, see among others: Glaeser et al. (1996); Hoxby (2000); Ichino and Maggi (2000); Sacerdote (2001); Duflo and Saez (2003); Hong et al. (2004); Bayer et al. (2009); Mas and Moretti (2009); Ouimet and Tate (2020).

market, rendering their investment behavior strategic substitutes (Dixit, 1980; Gal-Or, 1987).

Identifying the causal link running from firms' investment to the investment of its neighbor is empirically challenging. A typical approach when assessing the presence of peer effects is to regress a variable of interest on the group mean of itself (see e.g. Dougal et al. (2015); Leary and Roberts (2014)). OLS regressions using this empirical specification, however, do not allow the causal identification of peer effects, as one cannot infer whether the average investment level affects firm investment or whether firm investment (and thus average investment) is driven by some latent factors.²

We follow the setup of Dougal et al. (2015) and start by examining the correlation between a firm's investment and the average investment of its peers, defined as firms headquartered in the same Economic Area (EA) and Fama-French 12 industries. We focus on total investment which considers both investment in physical and intangible capital (Peters and Taylor, 2017) to examine local peer effects. Our OLS results confirm earlier findings of a positive relationship between firm investment and local peer firms' investment in the same geographic area (Dougal et al., 2015). Due to the reflection problem, however, these results do not allow a causal interpretation.

To identify the causal impact of local firms' investment, we employ a two-stage least squares (2SLS) estimation technique using changes in state corporate income tax rates as an excluded instrumental variable. In particular, we build our identification strategy on two parts: first, we exploit variations in corporate income tax increases across U.S. states to estimate the exogenous component of firm investment. Consistent with work indicating that taxes are an important factor for firm investment decisions (Cummins

²This "reflection problem" (Manski, 1993) arises when a researcher aims at estimating whether the actions or characteristics of a group have an impact on the action of the individuals that comprise the group.

et al., 1994; Djankov et al., 2010; Zwick and Mahon, 2017; Mukherjee et al., 2017), we find that an increase in corporate taxes lead to reductions in firm investment. Building on this, we identify peer effects by exploiting the geographic heterogeneity of peer firms and utilize the fact that some firms within the same EA are headquartered in different states and thus experience different state corporate income tax rate increases. An increase in state corporate income tax rates indirectly impacts firms in neighboring states due to its effect on firm investment and thus allows us to pin down peer effects.

Our empirical strategy exploits geographical variation within an EA to identify the causal link of peer effects, based on the assumption that a state’s decision to raise taxes is exogenous to firm investment in both the home and neighboring states. To test this assumption, we replicate the approach of Heider and Ljungqvist (2015) and examine whether the level (or growth) of investment in a state and its neighboring states influences the decision to increase corporate taxes. We do not find evidence that a state’s decision to increase corporate income taxes is significantly associated with (a) firm investment within that state or its neighboring states and (b) or neighboring states’ tax policies.³

Focusing on firms in the same EA, but located in different states and using the exogenous rise in states’ corporate income tax rates as an instrumental variable, we continue to find that firm investment exerts a positive effect on a peer firm’s investment behavior. This finding is robust to a battery of robustness tests. First, we account for possible indirect effect of tax spillover effects on customer-supplier relationships or firm subsidiaries and exclude major customers from the group of local peer firms, and drop firms with subsidiaries located in states experiencing a tax increase. Second, we address the concern that the identified positive peer effect is due to a loss of firms’ local expansion opportu-

³Specifically, we find no evidence that states raise corporate tax rates in response to corporate tax changes by neighboring states.

nities as tax increases in neighboring states might reduce the attractiveness to expand into these states. Third, we examine the concern that local demand shocks drive our findings and focus on firms belonging to non-tradable and tradable industries separately as non-tradable industries are considered to be more affected by local demand shocks. We do not find a significant difference, alleviating concerns that local demand shocks explain the presence of peer effects. Fourth, we follow earlier work and also implement a fixed-effects framework and document that our findings are robust. Fifth, we show that our results are not sensitive to alternative samples, different definitions of local peers, different set of control variables, and choice of clustering standard errors.

We then assess local peer effects further and assess the presence and nature of peer effects in physical and intangible investments in greater detail. Firms invest in physical and intangible capital and we are interested in evaluating peer effects for these two capital types separately for primarily two reasons. First, intangible and physical capital differ in nature and serve distinct strategic purposes. Thus, we are curious to assess whether peer effects are also present for each type of firm investment individually. Second, we hope to shed more light on the underlying economic mechanism by analyzing whether peer effects across capital types are similar or different. We find that local peer effects are also present when examining physical and intangible investment individually.⁴

Interestingly, we find no evidence of significant cross-investment type peer effects and investment in physical capital only shapes a peer firm's investment in physical capital, but not a peer firm's investment in intangible capital. Moreover, when examining differences across capital types, we find that peer effects only tend to be significant for firms where that type of capital is particularly important. For instance, firms that tend to rely more

⁴Our instrumental variable is also relevant when examining physical and intangible investment, as we find that a corporate income tax increase is followed by a drop in a firm's physical and intangible investment.

on intangible capital, only significantly shape peer firms' investment in intangible capital, but not investment in physical capital, and vice versa. These patterns suggest that firms selectively learn from peers whose strategic priorities and operational model align with their own. To examine whether learning from peers may be important here we provide two further tests by examining heterogeneity in firms' benefit from learning from peers. First, we find that local peer effects in physical investment are more pronounced among firms with weaker operating signals. Second, we show that peer effects in intangible investment tend to be more prevalent when knowledge spillovers between firms are significant. These findings are consistent with theories emphasizing the role of learning from peers when rationalizing peer effects in corporate investment.⁵

Our work contributes to recent studies exploring peer effects in corporate behavior (Leary and Roberts, 2014; Foucault and Fresard, 2014; Shue, 2013; Kaustia and Rantala, 2015; Grennan, 2019; Cao, Liang, and Zhan, 2019; Matray, 2021; Grieser, LeSage, and Zekhnini, 2021; Seo, 2021; Machokoto, Gyimah, and Ntim, 2021). Closest to our paper is Bustamante and Frésard (2021), who uses an instrumental variable strategy to identify the causal link of *non-local* peer firm effects. Our findings complement their results as we document that (a) in addition to the industry link, *local* peers also shape firm investment, and (b) these patterns also hold when examining investment in physical and intangible capital separately. Our results show that peer effects are present when firms invest in physical and intangible capital and offer insights regarding the underlying economic mechanism.

Our findings also add to the understanding of how local firms influence investment

⁵Our results do not allow us to draw inference regarding firms' optimal investment decision as we only examine how peer effects affect firm investment. It may be interesting to examine to what extent peer effects improve the efficiency of a firm's investment decision. This is, however, outside the scope of our paper.

behavior (Dougal et al., 2015; Ouimet and Tate, 2020; Matray, 2021; Grieser et al., 2021; Li and Wang, 2022). Dougal et al. (2015) finds that firms in the same EA exhibit a similar investment pattern, even if firms belong to different industries. They suggest that this co-movement of investment arises from endogenous interactions within a city, such as communications among managers or a better labor pool in growing cities. Matray (2021) provides evidence that innovation by one firm fosters innovation of neighboring firms through knowledge diffusion and learning across local firms. We add to this work as we use the exogenous increase of neighboring states' corporate income tax rates as a shock to peer firm investment and exploit heterogeneity in firms' exposure to this shock to identify the causal effect of firm investment on neighboring firms' investment decisions.

This paper is organized as follows: Section 2 presents our hypotheses regarding the sign of peer effects. Section 3 describes the data and empirical strategy. Section 4 presents the OLS results of local peer firm effects while section 5 discusses our instrumental variable strategy and presents 2SLS results. Section 6 examines investment in physical and intangible capital separately and examines peer cross effect of investment in physical and intangible capital. Section 7 concludes.

2 Hypothesis Development

2.1 Local peer effect in corporate finance

Research on social learning argues that a manager can infer information regarding the future by tracking the investment behaviors of peers. Learning is particularly relevant when informational asymmetries are significant and a manager's own signal regarding the future is noisy (Bikhchandani et al., 1992, 1998; Leary and Michaely, 2011). If man-

agers are further concerned about their reputation, or if their compensation is peer-based, they have additional incentives to mimic the investment choices of peers to conceal bad strategies and avoid negative repercussions (Scharfstein and Stein, 1990; Zwiebel, 1995; Graham, 1999). Moreover, localized networking among neighbors can facilitate information spillovers and enhance the learning or mimicking process (Arzaghi and Henderson, 2008; Engelberg et al., 2018). Closer proximity creates more opportunities for managers to meet and exchange information and expectations, resulting in more synchronized investment patterns.

Apart from these information-based theories, firm investment may also be a strategic response to neighboring peers (Dixit, 1980; Gal-Or, 1987; Lieberman and Asaba, 2006; Akdoğan and MacKay, 2012). An increase in investment by local rivals, for instance, may raise the price of local input factors. Meanwhile, intensified product market competition could drive prices down, eroding profits for firms producing similar goods and services further. As a result, firms may react by reducing investment when local peers increase theirs. Pursuing a differentiation strategy, however, can be costly and firms may choose to adopt homogeneous strategies to match the behavior of rivals to avoid falling behind. Especially when they compete for capacity in the short run or in a high-growth environment (Akdoğan and MacKay, 2008; Jiang et al., 2015). Thus, theories yield mixed effects regarding the direction of local peer effects on corporate investment depending on the underlying reason for peer effects.

2.2 Peer effects in physical and intangible investment

Previous research on peer effects in investment has primarily focused on capital expenditure in physical capital (Leary and Michaely, 2011; Bustamante and Frésard, 2021).

Firm investment can be categorized into physical and intangible investment according to the type of capital (Peters and Taylor, 2017). These two capital types are considered to be fundamentally distinct and serve different strategic purposes. Physical capital (e.g. machinery, factories, etc.) typically supports production capacity and operational efficiency. Intangible capital (e.g. R&D, branding, etc.), on the other hand, fosters innovation, market differentiation, and customer engagement.

The role of intangible capital has grown significantly in recent decades (Corrado and Hulten, 2010; Peters and Taylor, 2017; Crouzet et al., 2022), underlining the importance to examine investment behavior of firms in physical and intangible capital separately. Due to the differences between intangible and tangible capital investment with respect to their contribution for firm development, we expect that peer effects differ between these two capital investment types. Specifically, we expect that theories stressing the role of learning may be relevant for peer effects for investment in the *same* type of capital, but not for investment in different types of capital. For instance, when assessing the value of investing in physical capital a firm might be able to learn something from the neighboring firms' investment decision in physical capital. Observing that neighboring firms, for instance, are building new factories might be an informative signal for a manager to also ramp up investment in physical capital, yielding positive peer effects for investment in physical capital. The observation may be less informative regarding the decision to increase, for instance, a firm's R&D capacities and thus shaping peer effects across capital types.⁶

Furthermore, the potential forces driving local peer effects for physical and intangible investment need not be the same. Drawing on peer learning, the value of information

⁶Absorptive capacity theory (Cohen et al., 1990) argues that firms heavily invested in physical capital may lack the absorptive capacity or organizational structure needed to effectively respond to other signals from peers. Thus observing peers' intangible investments may not shape a firm's own physical capital investment decision.

derived from peers may vary across firms and types of capital, influencing the strength of peer effects. As it may be easier to observe a firm’s physical investments firms may be able to infer better insights about future prospects. Prior work argues that firms with weaker operating signals tend to rely more on peer investment as a source of information (Foucault and Fresard, 2014; Bustamante and Frésard, 2021). Similar to physical capital, intangible capital requires investment which is often manifested in research and development and human capital accumulation. However, the mapping from investment to accumulated capital may be less predictable and more uncertain for intangible capital (Crouzet et al., 2022). This uncertainty makes intangible investment harder for peer firms to observe and emulate accurately. Nevertheless, peer effects may remain relevant for intangible investment, particularly in sectors and areas with high concentration of knowledge resources, where knowledge spillovers amplify learning opportunities.

Based on these arguments, we expect heterogeneity across firms regarding the importance of peer effects in investment. Specifically, we expect that local peer effects in physical investment are more important when firms put more emphasis on peer firms’ investment as their own information is very low. Furthermore, we expect that firms with greater benefits from learning from peers due to potential knowledge spillovers exhibit larger peer effects in intangible capital.

3 Data and sample

3.1 Data source and variable construction

We focus on publicly listed firms in the United States in the CRSP/COMPUSTAT Merged database from the fiscal years 1989 to 2014. We remove (a) companies not traded

on the NYSE, Amex, or Nasdaq, (b) non-U.S. firms, (c) firms with a CRSP share code greater than 11, (d) firm-years with missing total assets or negative total assets/sales and (e) firms with a single panel year. We use firms’ historic headquarter states from regulatory filings to avoid bias from relocation, as COMPUSTAT backfills and reports the address of the current location. Information on state corporate income tax changes from 1989 to 2011 is provided by Heider and Ljungqvist (2015). We extend the data to 2014 based on information from the Tax Foundation.⁷ Data on macroeconomic variables, i.e. a state’s growth of GSP, unemployment rate, union penetration, population growth, and per capita income growth are collected and constructed following Heider and Ljungqvist (2015).

Following Dougal et al. (2015), we examine the similarity of investment behavior among firms located in the same Economic Area (EA). EAs are defined by the Bureau of Economic Analysis as relevant regional markets surrounding metropolitan areas, encompassing several counties and sometimes even spanning across state lines. EAs share social coherence and comprise a common regional market for labor, products and information. See Figure 1 for a map of EAs across the United States. The red shaded areas are the EAs that spread across state borders.

In measuring a firm’s investment rate, previous research often relies on the ratio of capital expenditure to physical capital or the book value of assets. However, this approach has the limitation of excluding a significant portion of firms’ intangible capital. In our study, we adopt the total investment measure proposed by Peters and Taylor (2017), which encompasses both physical and intangible capital investments. This comprehensive approach allows for a more accurate representation of a firm’s overall investment behavior.

Specifically, firm i ’s physical investment during year t is measured by scaling its capital

⁷<http://www.taxfoundation.org>

expenditure (Compustat item *capx*) by the firm’s total capital (K^{total})⁸ in the previous year:

$$I_{i,t}^{phy} = \frac{capx_{i,t}}{K^{total,t-1}}. \quad (1)$$

Firm i ’s intangible investment during year t is its expenditure in research & development (R&D) plus 30% of selling, general and administrative (SG&A), scaled by total capital in the previous year:

$$I_{i,t}^{int} = \frac{R\&D + (0.3 \times SG\&A)}{K^{total,t-1}}. \quad (2)$$

Then, total investment is defined as the sum of physical and intangible investment rates:

$$I_{i,t}^{total} = I_{i,t}^{phy} + I_{i,t}^{int}. \quad (3)$$

To account for outliers, we winsorize all variables at the 0.5 percent level in each tail.

3.2 Empirical specification and identification

3.2.1 Empirical benchmark model

We focus on firms in the same EA and consider a firm’s peers as firms operating in the same Fama-French 12 industries and EA. Our benchmark model utilizes a first-difference panel estimator:⁹

$$\Delta I_{i,t} = \beta \Delta \bar{I}_{-i,a,j,t} + \Delta X'_{i,t} \rho + \delta_{a/j/t} + \varepsilon_{i,t}, \quad (4)$$

⁸Firm total capital include the replacement cost of physical and intangible capital, where the former is the book value of property, plant and equipment (Compustat item *ppeg*) and the latter is calculated by Peters and Taylor (2017) and obtained via WRDS.

⁹In later analyses, we exploit the state-specific timing of state corporate income tax changes to identify the causal effect of peer firms’ investment. Since some states have more than one change in corporate income tax rates over the sample period, we follow Heider and Ljungqvist (2015) and also implement a first-difference estimation. In robustness checks, we employ the fixed effect model.

where Δ is the first-difference operator at the firm level, and $\Delta I_{i,t}$ is the difference of firm i 's investment rate between year t and $t - 1$; $\bar{I}_{-i,a,j,t}$ is the average investment of firm i 's local peers in the same industry j and EA a , excluding firm i ; $\delta_{a/j/t}$ are fixed effects at EA (a), industry (j) or year (t) level. $X'_{i,t}$ is a set of control variables including (1) the general industry investment level, proxied by the average investment rates of firms outside the EA ($\bar{I}_{-a,j,t}$), (2) the local investment level using average investment rates of firms in the same EA but different industries ($\bar{I}_{a,-j,t}$). We cluster standard errors at the firm level.¹⁰

3.2.2 Identifying the causal effect of firm investment

OLS estimation of regression model (4) does not allow for the identification of a causal link running from local peers' investment on firm i 's investment. For instance, time-varying latent factors at the local level, such as prices for raw materials or labor costs, may jointly affect the investment of firm i and its peers. To recover the exogenous component of firm i 's investment, we exploit unexpected changes in a state's corporate income tax rate as an instrumental variable for peer firms' investment.

A large literature examines the elasticity of investment concerning (corporate) tax rates (Cummins et al., 1994; Djankov et al., 2010; Zwick and Mahon, 2017; Mukherjee et al., 2017). In our study, we construct instrumental variables based on increases in U.S. state corporate income tax rates to analyze their effect on firm i 's investment. Specifically, we first assess whether an increase in a state's corporate tax rate influences firm i 's investment decisions. We then exploit the fact that state corporate income taxes are levied based on a firm's physical presence. As a result, firms located in the

¹⁰Our results are robust to clustering standard errors at different levels including the double clustering at the industry and EA level. (see Appendix Table A. 6).

same Economic Area (EA) but in different states experience varying impacts from tax changes. By focusing on EAs that span state borders, we can utilize state-specific changes in corporate income tax rates to identify firms' investment behaviors and recover the exogenous component of peer firms' investment. Since state-level tax policies only affect a subset of firms within an EA, we can examine the reactions of peer firms to changes in the investment of the affected firms using a two-stage least squares (2SLS) regression model.

3.3 Sample characteristics

We begin our analysis with all firms that report non-missing total investment figures from 1989 to 2014. To ensure a robust dataset, we exclude firms with fewer than five local peers in any given year.¹¹ Our final sample consists of 9,099 firms with non-missing total investment throughout the specified period. Notably, 21 out of 53 Economic Areas (EAs) span across multiple states, and approximately 47.9 percent of the firms in our sample are headquartered within these cross-state EAs. Table 1 presents the descriptive statistics for the main variables utilized in our analysis. On average, a firm's annual total investment rate amounts to about 22.7 percent of its total capital. Additionally, one-third of a firm's total investment is allocated to physical capital, while two-thirds is dedicated to intangible capital. Furthermore, firms have an average of 42 peer firms within the same EA.

¹¹Table A. 1 in the appendix provides additional details on the construction of our sample.

4 Firm investment and local peers' investments: OLS results

We build on existing work (Dougal et al., 2015) and examine the link between firm investment and local peer firms' investment using fixed-effects and first-difference estimators.¹² To capture general changes in firm investment, we control for (1) an industry-specific investment trend by including the investment of all non-local peer firms, i.e. firms involved in the same industry, but headquartered outside the EA, and (2) an area-specific investment trend by including the investment of local non-peers, i.e. firms headquartered in the same EA, but involved in a different industry. Furthermore, we account for unobservable factors at the EA-, industry- or year-level by including EA-, industry- and year-fixed effects.

Table 2 reports the regression results. In column (1), we start with the same specification used in Dougal et al. (2015) and replicate their results.¹³ In column (2), we use the first difference model where we estimate the regression model (4). The positive and statistically significant coefficient on the investment of local peers indicates that higher investment by local peer firms is associated with an increase in firm investment. We also confirm the findings of Dougal et al. (2015), as firms headquartered in the same area but involved in different industries are positively related to a firm's investment. Regarding economic magnitudes, the coefficient of $\Delta \bar{I}_{-i,a,j}$ in column (2) of Table 2 indicates that firm investment increases by 8.8% with a one-unit increase in local peer investment. This represents 0.407 percentage points when the change in peer firms' investment increases

¹²Due to the nature of our instrumental variable (several increases in a state's corporate income tax rate over the sample period) our preferred specification is a first-difference model.

¹³Results are qualitatively similar if we restrict attention to the same sample of firm-year observations employed in the first-difference model (column 2).

by one sample standard deviation.

Our results show a positive relationship between local peer firms' total investment. This positive and significant coefficient, however, does not allow a causal interpretation as local unobservable time-varying factors could affect firm investment jointly. In the following 2SLS analysis, we address this issue and recover the exogenous component of peer firms' investment.

5 The impact of local peers on corporate investment

We start by examining how changes in U.S. state corporate income tax rates affect firm investment. Building on this, we construct instrumental variables to identify the causal impact of local peer effects of corporate investment.

5.1 Preliminaries

Understanding the effect of corporate tax on investment is of great importance to economic growth and development. Taxes are considered to affect investment in the neo-classical model through the user cost of capital, as well as in the Q model (Jorgenson, 1963; Hall and Jorgenson, 1967; Tobin, 1969; Summers, 1981; Hayashi, 1982). Examining the relationship between corporate tax rates and investment in a cross-country analysis, Djankov et al. (2010) find that corporate tax rates have an adverse effect on aggregate investment and entrepreneurial activity. Recent studies using micro-level data document that tax policies may have a significant impact on firms' investment decisions.¹⁴ Mukherjee et al. (2017), for instance, show that investment in innovative activities could be adversely affected by increases in state corporate taxes. Zwick and Mahon (2017) find

¹⁴See further discussion in Hassett and Glenn Hubbard (2002).

that temporary tax incentives in the U.S. on equipment investments boost firm investment, especially when the policy generates immediate cash flow.

States in the U.S. tend to tax corporate activities within their state borders by taxing profits or revenues. Although state taxes are smaller compared to federal taxes, they are nontrivial for firms' overall tax burden. Moreover, states are considerably active in rising and cutting state corporate tax rates over time. This variation then translates into changes in a firm's total tax burden and affects corporate finance and investment decisions. Exploiting 121 changes in corporate state tax rates from 1989 to 2011, Heider and Ljungqvist (2015) find that an increase in states' corporate tax rates in the U.S. increases firm leverage, consistent with dynamic trade-off theories of capital structure. Asker et al. (2015) show that private firms increase investment spending in response to tax cuts and reduce it in response to tax increases. Focusing on real effects, Ljungqvist and Smolyansky (2014) compare contiguous counties of neighboring states and find that an increase in a state's corporate tax rate leads to a decrease in employment and a reduction in income.

5.2 State corporate income tax rates and firm investment

5.2.1 The effect of tax changes on firm investments

Motivated by theories and evidence examining the importance of taxes on firm investment, we now study the effect of U.S. state corporate income tax rates on firm investment.

Similar to Heider and Ljungqvist (2015) we estimate the following regression model:¹⁵

$$\Delta I_{i,t} = \beta_1 TaxInc_{s,t-1} + \beta_2 TaxCut_{s,t-1} + \gamma \Delta X_{i,t} + \delta_{a/j/t} + \varepsilon_{i,t}, \quad (5)$$

where Δ is the first-difference operator at the firm level, $I_{i,t}$ is firm i 's investment rate at time t ; $TaxInc_{s,t-1}$ ($TaxCut_{s,t-1}$) is a dummy variable taking on the value of one if state s increases (decreases) its corporate income tax in year $t - 1$, and zero otherwise.¹⁶ $X_{i,t}$ is a set of (a) firm control variables and (b) macro control variables to account for changes in the macroeconomic environment due to the tax change, including lagged state's growth of GSP, unemployment rate, dummy variables indicating whether the state increased sales taxes or top personal taxes, state union penetration, and tax competition, EA growth of population and personal income per capita; $\delta_{j,t}$ is a set of industry-specific time dummies and δ_a are EA fixed effects. Standard errors are clustered at the firm level. The coefficients of interest are β_1 and β_2 which estimate the impact of an increase and decrease in the state corporate income tax rate on firm investment, respectively.

Firms that have a presence in more than one state are subject to state corporate income tax in each state where they have a physical presence, and their taxable income in each state is determined using an apportionment formula based on an average of the fractions of the firm's total payroll, sales, and property located in that state. However, information regarding the network of U.S. firms is not readily available. Heider and Ljungqvist (2015) hand-collect information on firms' geographical spread and examine the

¹⁵States can exhibit several changes in their corporate tax rate over the sample period. A first-difference estimator therefore allows us to exploit multiple tax changes in a state. In robustness checks, we also use the fixed effect model by restricting the sample to the five years following the first corporate tax change in each state. The effect is not sensitive to the estimation models.

¹⁶Following Heider and Ljungqvist (2015) and Mukherjee et al. (2017), we focus on binary indicators due to the difficulty of quantifying changes in terms of marginal tax rates in some cases. Moreover, state-specific changes in corporate taxes can take different forms, such as the suspension of net operating loss deductions by California in 2002 or the reduction in federal income tax deductibility from 100% to 50% introduced in Missouri in 1993.

sensitivity of their findings when they account for potential differences in firms' exposure to a local tax change. Their findings are not sensitive to this adjustment and hence they conclude that focusing on a firm's home state's tax change appears to be an innocuous approximation.

Table 3 reports regression results from estimating regression (5). The results show that a rise in state corporate income tax rates is followed by a significant drop in total investment of about 63 basis points. Similar to Mukherjee et al. (2017), we do not find a significant effect of tax cuts on investment. In column (2) we include firm and local economic control variables and continue to find that an increase in state corporate income taxes is followed by a reduction in firm investment. In our 2SLS analysis, we only consider firms headquartered in multi-state EAs. To examine if the effect of a tax increase is also present in this subsample, we replicate the regression for firms in the sub-sample using firms headquartered in multi-state EAs. Columns (3) and (4) present the regression results, and we continue to find that an increase in state corporate income taxes is associated with a reduction in firm investment.

We further examine the total investment trend before and after state corporate income tax rises by augmenting the regression with separate tax rise dummy variables for four years before and after the tax rise:

$$I_{i,t} = \beta_{-4}TaxInc_{s,t-4} + \beta_{-3}TaxInc_{s,t-3} + \cdots + \beta_3TaxInc_{s,t+3} + \beta_4TaxInc_{s,t+4} + \delta_i + \delta_t + \varepsilon_{i,t}. \quad (6)$$

The coefficients from estimating the regression model (6) are plotted in Figure 2. The pattern in Figure 2 suggests that there is no significant trend prior to a tax rise, but firm investment drops once states increase corporate income taxes. This supports the

idea that a tax rise is not associated with anticipatory effects as firms do not adjust their investment before the tax rise. The rise in corporate income tax rates thus represents a shock to firm investment.

5.2.2 Determinants of state corporate income tax rises

The underlying assumption of our identification strategy is that a state's tax rise is exogenous to firm investment. To utilize the state-specific increase in corporate income taxes in an instrumental variable strategy, we assume that a neighboring state's corporate tax rate change is exogenous to the investment of firms in a state. This identification assumption would be violated if states increase corporate income tax rates when firms tend to invest a lot in response to neighboring states' tax policies. We thus examine whether state tax increase could be predicted by local firm investment level or neighboring states policies.

Heider and Ljungqvist (2015) investigate determinants of corporate tax changes and their analysis indicates that primarily state-economic and political conditions shape U.S. states' corporate income tax changes. States that raise corporate taxes, for instance, tend to have a Democratic governor and are more likely to have a state budget deficit in the previous year. We replicate their findings and examine further whether aggregate firm investment within a state and/or in neighboring states as well as neighboring state tax policies are associated with the timing of a state's corporate income tax rise.

Table 4 reports results from examining determinants of tax rises. Consistent with Heider and Ljungqvist (2015), we find that the degree of tax competition among neighboring states as well as the fiscal situation of the state correlates with the timing of corporate tax rises. We are specifically interested in the link between firm investment as well as

neighboring states' tax policies in a state's decision to increase corporate income taxes. Regression results in column (2) indicate that there is no statistically significant relationship between the increase in state corporate income taxes and the aggregate investment in local or neighboring states. In column (3), we further examine the relationship between rises in a state's corporate income taxes and the change of aggregate investment in local or neighboring states.¹⁷ We do not find that state-level investment is significantly associated with a state's decision to increase taxes or a neighboring state's decision to raise corporate income tax rates. Finally, we examine the spatial correlation of tax changes between neighboring states and evaluate whether a rise in corporate income tax rates correlates with changes in corporate tax rates in neighboring states (column 4). We do not find evidence that neighboring states' corporate income tax policies are significantly associated with tax changes in a state. These findings alleviate the concern that corporate income tax rate rises are affected by local or neighboring state firm investment or neighboring states' corporate tax policies.

5.3 Identifying peer effects: Multi-state EAs and state corporate income tax shocks

Our regression analysis indicates a robust first-order effect of a tax rise on firm investment. Armed with this insight, we develop three instrumental variables to identify the causal link between firm investment and neighboring firms' investment. We focus on EAs that span more than one state to recover the exogenous component of peers' investment

¹⁷Our results indicate that increases in state corporate income taxes are also significantly correlated with increases in a state's sales tax and its top personal income tax. When examining the effect of tax changes on firm investment (Table 3), we did not find a statistically significant association between firm investment and changes in sales tax or top personal income taxes. In further tests (Section 5.5.3), however, we also account for potential confounding effects due to changes in sales tax and exclude observations where state also increase sales taxes or top personal income taxes. Our results are robust to that exclusion.

as not all peer firms in an EA are affected by a state’s corporate income tax rise due to their headquarters location. Thus, we exploit the fact that a rise in state corporate income tax rates only affects firms that have a physical presence in that state.

To illustrate our identification strategy, consider the New York-Newark-Bridgeport EA, depicted in Figure 3. The New York-Newark-Bridgeport EA spans four different states: NY, NJ, CT and PA and our sample contains firms headquartered in any of the four states. In 2002, NJ increased its business taxes. This increase in corporate income tax represents a shock to the financing and investment of firms headquartered in NJ, but is thought to be exogenous to the investment behavior of firms headquartered in any of the other three states. This assumption is supported by the finding that the decision to increase corporate income taxes is not associated with neighboring states’ changes or levels of firm investment (see Table 4). Thus, we can identify the exogenous component of investment for firms in NJ due to the increase in corporate income tax rates. Since firms in NJ are part of the local peer group of this EA, we can estimate the exogenous component of local peer firm investment for these other firms and identify the causal impact of local peer effects.

We exclude firms that were themselves subject to a tax increase in the same year. That is, we only keep firm-year observations if a firm’s home state did not increase corporate income tax rates in that year. The final sample for this 2SLS analysis consists of 3,871 firms.¹⁸

¹⁸We compare our sample to the universe of Compustat firms and find that firms located in a multi-state EA tend to be larger, have greater total cash flow, lower total and physical investment and higher intangible investment (see Panel C of Appendix Table A. 1).

5.4 The causal impact of peers' investment behavior: 2SLS Results

In the following 2SLS analysis, we restrict attention to firms headquartered in EAs that span across more than one state. To examine if our OLS results are robust to this subsample, we re-estimate regression model (4) for the subsample of firms headquartered in a multi-state EA. Appendix Table A. 2 reports OLS regression results and, similar to before, we find that firm investment is positively associated with local peer firms' investment based on the subsample.

We then construct three instrumental variables to capture firms' exposure to local peers' investment changes due to the increase in U.S. states' corporate income tax rates. First, we use the fraction of local firms affected by a tax rise in a multi-state EA. Average local investment should be smaller when a higher fraction of firms are exposed to the tax increase. Second, using insights from Table 3, we estimate the predicted average investment shock on peer firms due to the tax increase. Specifically, we start from regression model (5) and compute the state-specific effect of a tax rise on firm investment ($\hat{I}$) by allowing the coefficient on the tax rise dummy to vary across states. These state-specific coefficients thus provide a better assessment of the average magnitude of the tax shock on firm investment in a given state. Similar to the construction of our main variable $\Delta\bar{I}_{-i,a,j}$, we construct our first instrumental variable by calculating the average predicted change in peer firms' total investment rate $\Delta\hat{I}$ as the change in the average of $\hat{I}$ across all other local peer firms in an EA (*Predicted state-specific* $\Delta\hat{I}$). Third, we allow the effect of the tax rise to vary by industry and state, and estimate the state-industry-specific reduction in firm investment due to a tax rise. As before, we then compute the average change in investment across all other local peer firms in an EA and compute an alternative

instrumental variable (*Predicted state-industry-specific* $\Delta \hat{I}$). The last two instrumental variables allow us to capture heterogeneity across areas and industries regarding the effect of a corporate state tax rise on peer firm investment.

Panel B in Table 5 reports the first stage regression results using these excluded instrumental variables. Consistent with our results at the firm level (Table 3), we find that an increase in corporate income tax rates reduces average firm investment, indicated by the negative and statistically strong coefficient in column (1). The positive coefficient on the predicted state-specific change (column 2) and state-industry-specific change (column 3) shows that the predicted change in peer firm investment due to a tax rise is positively correlated with the observed change in firm investment. For each excluded instrumental variable, we find a statistically significant relationship between the excluded instrument and peer firm investment, as indicated by the high value of F-statistics regarding the significance of our excluded instruments. Panel A of Table 5 reports the second stage regression results, analyzing the impact of firm investment on local neighbors' investment. Consistent with our OLS findings, we find that peer firms exert a positive and statistically strong effect on local firms' investment. The coefficients on ΔI^{Total} are positive and statistically significant for all the excluded instrumental variables. Economic magnitudes of the exogenous component of peer firms' investment are sizable. To ease the interpretation of economic magnitude, we scale the coefficients by the corresponding variable's standard deviation.¹⁹ Focusing on the coefficient reported in column (1) of Table 5, we find that a firm's change in total investment increases by 1.57%-points in response to a one standard deviation increase in *instrumented* local peer investment, which is about 6.9% of average total investment.

¹⁹The coefficient in the second stage is scaled by the sample standard deviation of the predicted peer firms' investment from the first stage to represent economic magnitudes concerning the exogenous component of peer firms' investment.

5.5 Robustness tests

5.5.1 Indirect effect of tax spillovers

One potential concern is that state corporate taxes may influence peer firm investment indirectly through customer-supplier links or firm subsidiaries. To address this concern, we conduct two additional tests: first, we exclude a firm’s major customers from the local peer group when constructing our peer firm measure. Specifically, we use information from Compustat’s segment data, and identify the set of a firm’s major customers that account for 10% or more of the firm’s total revenue and re-construct the local peer investment portfolio excluding these large customers. Second, we use Compustat’s subsidiary database (available since 1995) and identify the location of a firm’s subsidiaries in other states. We then exclude firm-years where a firm has subsidiaries located in neighboring states after that state increased corporate income taxes. This addresses concerns of direct effects of state corporate income tax changes on firm investment due to the presence of subsidiaries in affected states. Results from these modifications are reported in Table 6. Columns (1) and (2) present the second-stage results excluding major customers from the local peer portfolio. The estimated coefficient of peer effects remains positive and statistically significant, suggesting that the observed peer effect is not driven by indirect tax shocks transmitted through customer links. Columns (3) and (4) exclude firm-years where firms have subsidiaries in tax-affected states. We continue to find a statistically significant positive effect of peers’ capital investment. These findings indicate that our peer effect estimates are not confounded by exposure of a firm to the tax change due to its subsidiaries or (large) customers.

5.5.2 Local expansion opportunities

Our reduced-form results from 2SLS indicate that firms tend to reduce investment when a neighboring state raises corporate taxes. If firms were contemplating an expansion into the neighboring state, then a tax increase in that state may discourage a firm from expanding and thus reducing its investment. Since firms in affected states also reduce their investment, one would then estimate a positive association between firms' investment in an area.

To examine whether this, we assess whether peer effects differ depending on firms' expansion opportunities into neighboring states. We use two proxies to capture a firm's expansion opportunities into neighboring states. First, we count the number of states within an EA that are not affected by tax increases. Firms located in EAs with more states offer greater expansion opportunities even if one state raises corporate income taxes. Second, to account for differences in state size, we compute the proportion of firms in neighboring states that are unaffected by a tax change. Specifically, we calculate the share of the tax-unaffected area within an EA and aggregate the proportion of firms in each state located within that EA. We then construct two dummy variables (*less_opp_n* and *less_opp_size*) indicating fewer expansion opportunities if the number or size of tax-unaffected states falls below the median. The results are reported in Table 7. In column (1), the coefficient on *Neighbor_TaxInc*, which is a dummy variable equal to 1 if at least one of the firm's neighboring states increase state corporate taxes, is significantly negative, consistent with our reduced form results. In columns (2) and (3), we interact *Neighbor_TaxInc* with the aforementioned two variables capturing expansion opportunities. Both coefficients on the interaction term are positive and insignificant. Thus we do not find evidence that firms with fewer nearby expansion opportunities re-

duce investment more when neighboring states increase corporate income taxes. This finding alleviates concerns that the observed peer effect is primarily affected by firms responses to neighboring states' tax increases as these tax increases reduce firms' nearby investment opportunities.

5.5.3 Local demand shocks

Corporate income tax increases may be passed alongside other types of state tax changes, such as changes in sales or personal income taxes (Baker et al., 2025). This may then be accompanied by lower retail consumer demand if consumers are primarily local-based. As a result, it may reduce local firms' investment decision. To address the concern that spillovers in local demand shocks explain our findings, we perform additional robustness tests.

First, we examine heterogeneity in peer's investment decision across tradable and non-tradable industries. Firms in non-tradable industries primarily serve geographically local markets, whereas firms in tradable industries compete in broader markets. If our results are affected by local demand shocks, then we expect the peer effect to be stronger among non-tradable firms. To test this, we classify industries as non-tradable using two approaches: (i) following Mian and Sufi (2014), we define firms belonging to retail and restaurant-related industries as non-tradable firms, and (ii) we additionally include utilities and construction as non-tradable industries. We construct the corresponding indicators and interact them with the IVs in the 2SLS regressions.

Table 8 reports the results when examining differences in peer effects in tradable and non-tradable firms. In both classifications, the interaction terms are statistically insignificant, indicating that peer effects are not systematically larger among non-tradable

firms.²⁰ Thus, our findings are unlikely to be fully driven by local demand shocks.

Second, we explicitly control for coincident tax changes that may pose an indirect impact on firm investment. We re-estimate our IV results after excluding state-years that experienced sales or personal income tax increases, in which cases the remaining samples should not be affected by these indirect effects. Coefficients obtained from this subsample are reported in Panel B of Table 8 and we find a robust a statistically significant positive coefficient. In additional specifications, we also directly control for these tax changes as local controls in the regressions. The results, reported in Appendix Tables A. 5 remain robust, further alleviating the concern that local demand shocks drive our estimates.

5.5.4 Fixed-effects model

To exploit repeated changes in corporate income taxes at the state level, we implement a first-difference estimator. To address concerns that first-differencing may amplify measurement errors, we also utilize a fixed-effects framework as a robustness check. To address the fact that there are multiple tax changes or tax reversals for some states over time, we restrict attention to firms located in states after the first five years following the first corporate tax change in each state.

We start to assess the impact of state corporate tax changes on firm investment using a firm fixed-effects estimator. Specifically, we identify the first tax change in each state during our sample period and construct dummy variables *TaxInc_after* and *TaxCut_after* equal to one in years within five years after the state increased or reduced corporate tax, respectively. Similarly to before, we then construct the three IVs based on the fixed-effects estimation results. The results of state tax changes on investment are presented in

²⁰Interestingly, the negative coefficients on the interaction terms indicates that non-tradable industries tend to have a weaker peer effect.

the Appendix Table A. 3.

We observe a significant and negative effect of tax increases on total investment, consistent with our first-difference results. We then construct three instrument variables based on the fixed-effects model. Table 9 reports 2SLS results from this procedure and we continue to find a positive and statistically significant coefficient on peer effects.

5.5.5 Additional sensitivity checks

We consider other sensitivity tests of our findings with respect to alternative samples, peer definitions, control variables, and clustering. First, we restrict our attention to firms headquartered in one of the 20 largest EAs to address concerns that our findings are driven by firms located in some smaller EAs. The second-stage regression results from this subsample are reported in columns (1) to (2) in Appendix Table A. 4 and we continue to find that firms exert a positive influence on the investment behavior of peer firms.

Second, rather than concentrating on EAs, we shift our focus to smaller urban regions, specifically Metropolitan Statistical Areas (MSAs). MSAs are defined as geographic entities that include a central urban area with a population of 50,000 or more inhabitants, characterized by a significant degree of social and economic integration. As in our previous analysis, we limit our study to MSAs that span more than one state and employ instrumental variables based on the methodology established earlier. Due to the smaller size of MSAs compared to EAs, our sample is further reduced, consisting of 2,010 firms across 11 distinct MSAs for this analysis. Columns (3) and (4) of Appendix Table A. 4 present the regression results from this investigation. Consistent with our earlier findings, we observe that investment decisions made by firms positively influence the investment decisions of their peers at the MSA level, suggesting that our results are robust regardless

of whether we focus on EAs or MSAs.

Third, we use a finer industry classification and define firms in the three-digit SIC and EAs as local peers. We only consider firms with at least five local peers in a year. The results are reported in columns (5) to (6) of Appendix Table A. 4. We continue to find a positive peer effect with the finer industry classification.

Fourth, we include firm-level and local characteristics that could affect firm investment in the regression. Specifically, we control for firm characteristics including firm size, total Tobin's Q, and cash flow, where total Tobin's Q and cash flow are constructed following Peters and Taylor (2017). We also control for macroeconomic factors at the local level, including the growth of state GSP, unemployment rate, state union penetration, EA growth of population, and real income per capita at the state level. We include a measure of tax competition between neighboring states following Heider and Ljungqvist (2015), defined as the difference between a state's corporate income tax rate and the highest corporate income tax rate levied by any of the neighboring states. In addition, we include other state-level tax changes, including indicators of state sales tax increases and state personal income increases.²¹ The results from including these additional control variables are reported in Appendix Table A. 5 and we continue to find that peer firms' significantly shape a firm's investment behavior.

Finally, we examine the robustness of our results to different choices of clustering standard errors (see Appendix Table A. 6). Our results are not due to specific choices of clustering standard errors as we continue to find a positive and statistically significant link between firm investment and peer firms' investment decision.

²¹Details regarding the construction of the variables are listed in the Appendix A.

6 Physical and intangible investment, and potential channels

6.1 Local peer effects of physical and intangible investment

Firm investment can be categorized into physical and intangible categories based on the nature of capital (Peters and Taylor, 2017). Corrado and Hulten (2010) document a compositional shift toward contribution of intangible capital which overtook physical capital to become the largest systematic source of growth. Similarly, Crouzet et al. (2022) find a rising ratio of intangible to tangible assets among U.S. public firms, coinciding with a decline in tangible investment rates.²² Motivated by these facts, we now examine whether local peer effects are present when examining investment in physical and intangible capital separately.

To assess local peer effects for different investment types, we re-estimate regression model (4) by separating firm total investment into investment in physical capital and investment in intangible capital. Table 10 presents the results of the second-stage regression analysis. As before, we assume that changes in state corporate income tax rates influence firms' investments in both physical and intangible capital. To further investigate this, we replicate our earlier analysis by replacing the dependent variable (total investment) with physical and intangible investment, respectively (see the Appendix Table A. 7). Our findings indicate that an increase in state corporate income tax rates is associated with a significant reduction in both physical and intangible investments. Our instrumental

²²Understanding the interplay between firms' investment in physical and intangible investment is both intriguing and important (Corrado and Hulten, 2010; Crouzet et al., 2022; Crouzet and Eberly, 2018). We examined the correlation of investment in physical and intangible capital at the firm level and find a significant positive correlation. However, there seems to be considerable cross-industry as well as cross-time variation as we find that the effect varies, for instance, for firms with high intangible intensity and during economic downturns. A comprehensive investigation of this issue is beyond the scope of this paper, but we view it as an avenue for future research - both at the theoretical and empirical level.

variables significantly explain the physical and intangible investments of the firms, as evidenced by the statistically significant coefficients in the first-stage regression (Panel B of Table 10). In the second stage, we observe that peer firms' investments in physical capital (columns (1) and (3)) and intangible capital (columns (4) and (6)) positively impact a firm's investment in both types of capital.

6.2 Peer effects in cross-type capital investment

We investigate cross-effects to gain deeper insights into the presence of peer effects in investment decisions. Given the distinct features of physical and intangible capital, we expect managers to primarily learn from peer firms' investing in the same type of capital. For instance, when assessing the value of investing in physical capital, a firm may learn more from observing the investment decisions of neighboring firms in factories or machines than from observing the investment decision in branding or R&D, and vice versa. Thus, we hypothesize that a firm's investment decisions are predominantly influenced by the investment choices of peers within the same type of capital.

To test this empirically, we augment our regression model by regressing firm investment on (a) peers' investments in physical, and (b) peers' investment in intangible capital separately. Panel A of Table 11 reports regression results.²³ Consistent with our hypothesis, we find that a firm's investment in physical capital is only affected by peer firms' investment in physical capital (columns (1) to (2)). Neighboring firms' investment in intangible capital does not significantly affect a firm's investment in physical capital.²⁴

²³Note that we instrument the investment of peer firms in physical (intangible) capital with the predicted level of the peer firms in physical (intangible) capital based on the increase in state corporate income tax rates, respectively.

²⁴The patterns remain when using finer industry classification (three-digit SIC) to define local peers, suggesting that the results are not due to classification-driven measurement issues. See the results in Appendix Table A. 8.

When examining investment in intangible capital (columns (3) to (4)) we continue to find this pattern as peers' investment in intangible capital significantly affects a firm's intangible investment; peers' investment in physical investment, however, does not play a role for a firm's intangible investment decision.

The lack of cross-type peer effects suggests that managers prioritize information directly relevant to their firm's strategies and operational focus. In that case, we expect peer effects to be stronger where a specific type of capital - intangible or physical - is more important to a firm's operations. To test this, we categorize firms based on their primary operational strategy, using intangible intensity (defined as intangible capital over total capital) as a proxy variable. We then split firms into two groups based on the median values of intangible intensity: firms in a higher intangible intensity group are firms with a greater dependence on intangible capital in production, while lower intensity suggests a greater reliance on physical capital.

We re-estimate the cross-type peer effect regressions for each subsample, using the state-industry-specific IV, and report the results in Panel B of Table 11. Consistent with our expectations, the peer effect for physical investment is driven by firms that use physical capital as primary strategy. While we find that peer effects of intangible investment are present in both samples, we find the effect to be more pronounced for firms depending more on intangible capital. These results are consistent with the idea that firms selectively learn from peers whose investment decisions align with their own strategic priorities and operational models.

6.3 Signal precision and knowledge spillovers

Our results show that investments made by nearby firms positively impact peer firm investment. Moreover, we find that that this effect primarily emerges when firms tend to rely on the same type of capital. This is consistent with economic theories suggesting learning or herding for peer firms.

If learning tends to be more important, we hypothesize that local peer effects will be more pronounced when firms have stronger learning incentives or opportunities to learn from other firms. Specifically, we estimate the following regression using the previous 2SLS estimation:

$$\Delta I_{i,t} = \beta_1 \Delta \bar{I}_{-i,a,j,t} \times Above_{i,t} + \beta_2 \Delta \bar{I}_{-i,a,j,t} + \Delta X'_{i,t} \rho + \delta_{a/j/t} + \varepsilon_{i,t}. \quad (7)$$

where *Above* is a proxy dummy variable that takes on the value of one if firms' learning incentives or opportunities are considered to be stronger.

To assess the role of learning incentives, we start by examining whether firms with less precise information exhibit investment behavior that is more similar to that of their local peers. To proxy for a firm's information precision, we follow previous work and use (a) equity volatility²⁵ and (b) ROA volatility²⁶ to differentiate firms regarding their information precision (Ljungqvist et al., 2017; Bustamante and Frésard, 2021). The idea is that volatile earnings suggest that a firm is less willing (or able) to smooth earnings and thus less informed about future developments. We then test whether these firms are more influenced by peer firms' investment behavior. Thus, we construct a dummy

²⁵We calculate equity volatility as the standard deviation of the monthly return over the past twelve months.

²⁶We calculate ROA volatility as the standard deviation of the seasonally adjusted quarterly return on assets for the past twelve quarters.

variable taking on the value of one if a firm’s equity or ROA volatility is above the sample median value of its local peers in each year.

Table 12 reports regression results based on the state-industry predicted IV. In Panel A we report regressions where we focus on peer effects in physical investment while we focus on investment in intangible capital in Panel B. Columns (1) and (2) of Panel A show that the coefficient on the interaction term is significantly positive and larger than the coefficient on $\Delta \bar{I}_{-i,a,j,t}$. This suggests that the influence of local peers on physical investment is more pronounced for firms with higher stock and performance volatility, supporting the notion that these firms have greater incentives to mimic their peers’ investment behavior. When analyzing firm investment in intangible capital (Panel B), however, we only find weak evidence for higher peer effects for firms with lower information precision. This suggests that firms with low information precision particularly learn from their peers when deciding upon investment in physical capital.

As mentioned earlier, intangible capital consists of investments in organizational capital, innovative products and patents. These investments are inherently harder to accurately quantify and observe and consequently, learning from peers’ intangible investment may occur differently. Given the critical role of human capital in intangible capital, we hypothesize that peer effects for intangible investments to be more pronounced in knowledge-intensive industries and/or regions. To capture variations in firms’ exposure to knowledge-intensity environments, we first calculate the ratio of each firm’s R&D stock, scaled by total capital.²⁷ Firms with a higher R&D stock are more knowledge intensive. We examine heterogeneity across industries by computing the average ratio of this variable for all firms within an industry each year. We then compute the average

²⁷Following Peters and Taylor (2017) we construct a firm’s R&D stock as the accumulated R&D spending over the sample period.

value over years and consider industries with an aggregate ratio above the sample median as knowledge-intensive.

The regression results using this definition of knowledge-intensive firms are reported in column (3). We do not find evidence that firms belonging to knowledge-intensive industries exhibit different peer effects regarding investment in physical capital. Examining investment in intangible capital, however, our results show that only firms in knowledge-intensive industries display significant peer effects. To address concerns that knowledge-intensive industries might be clustered in certain areas, we refine our definition to account for heterogeneity in firms' knowledge intensity within an area. Consider, for instance, a high knowledge-intensive firm located in an area where most of the other firms are low knowledge-intensive. In this case, we expect that the high knowledge-intensive firm will learn relatively less from its (low knowledge-intensive) peers, and vice versa. Thus, we first compute for each firm i and year the average knowledge intensity within an EA and industry, excluding the knowledge intensity of firm i . We then classify firms with a ratio above the sample median to comprise higher knowledge-intensive firms. Column (4) reports regression results using this dummy variable to characterize local knowledge-intensive firms. As before, we find that peer effects in investment in intangible capital are stronger for firms operating in knowledge-intensive industries within an EA. However, there are no significant differences in investment in physical assets between firms with high level of knowledge stock.

7 Conclusion

This paper empirically analyzes the effect of neighboring firms' investment on corporate investment. Using OLS regression, we find that a firm's investment is positively

correlated with the investment decisions of local peer firms. However, estimating the causal effect of local peers on firm investment is challenging due to the reflection problem and common unobservable local factors. We address these challenges by employing a 2SLS estimation technique using instrumental variables based on exogenous changes in state corporate income taxes to identify the causal impact of local peer effects. We find that a state’s aggregate level of investment or its neighboring states’ investment level (and changes) are not able to explain the timing of corporate income tax increases, supporting the validity of our identification strategy. Our 2SLS regression results corroborate the OLS results as we continue to find that local peers positively influence a firm’s investment decision. The effect remains robust for a comprehensive considerations of alternative explanations and robustness checks.

To shed more light on the underlying mechanisms, we examine local peer effects on physical and intangible investment separately. We find that local peer effects exists for both types of investments. Interestingly, we find no evidence for cross-type peer effects in firms’ investments as firm investment in intangible capital only significantly affects peer firms’ investment in intangible capital, and vice versa. Further, we find that peer effects in physical investments are more pronounced among firms with greater earnings/equity volatility compared to their local peers, while peer effects in intangible investments are stronger for firms operating in knowledge-intensive industries or those surrounded by a greater concentration of knowledge-intensive local peers. This pattern is consistent with the idea that these firms benefit more from learning from their peers, thereby amplifying the strength of peer effects in these contexts.

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Figure 1: **A map of Economic Areas in the United States**

This figure plots the geographic boundaries of Economic Areas (EAs) in the United States as defined by the Bureau of Economic Analysis in 2004. The red shaded areas are the EAs that spread across state borders.

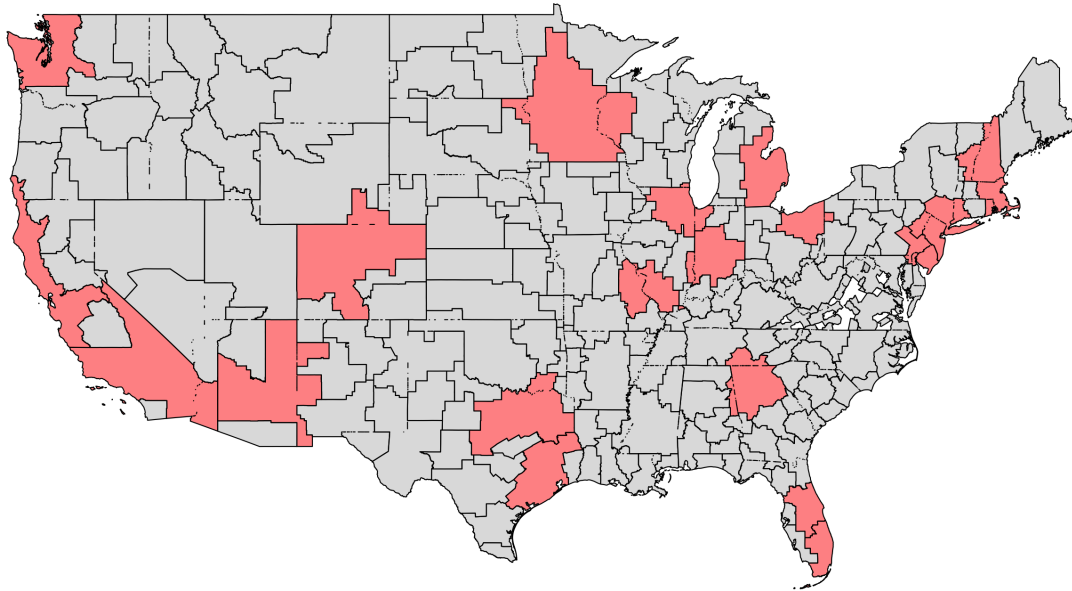


Figure 2: **Total investment before and after a rise in state corporate income tax**

This figure shows the evolution of total investment around state corporate tax increase. The solid line plots the point estimates from $I_{i,t}^{Total} = \beta_{-4}TaxInc_{s,t-4} + \dots + \beta_4TaxInc_{s,t+4} + \delta_i + \delta_t + \varepsilon_{i,t}$, using the tax increase year as the reference year. The dashed lines plot the 95% confidence interval.

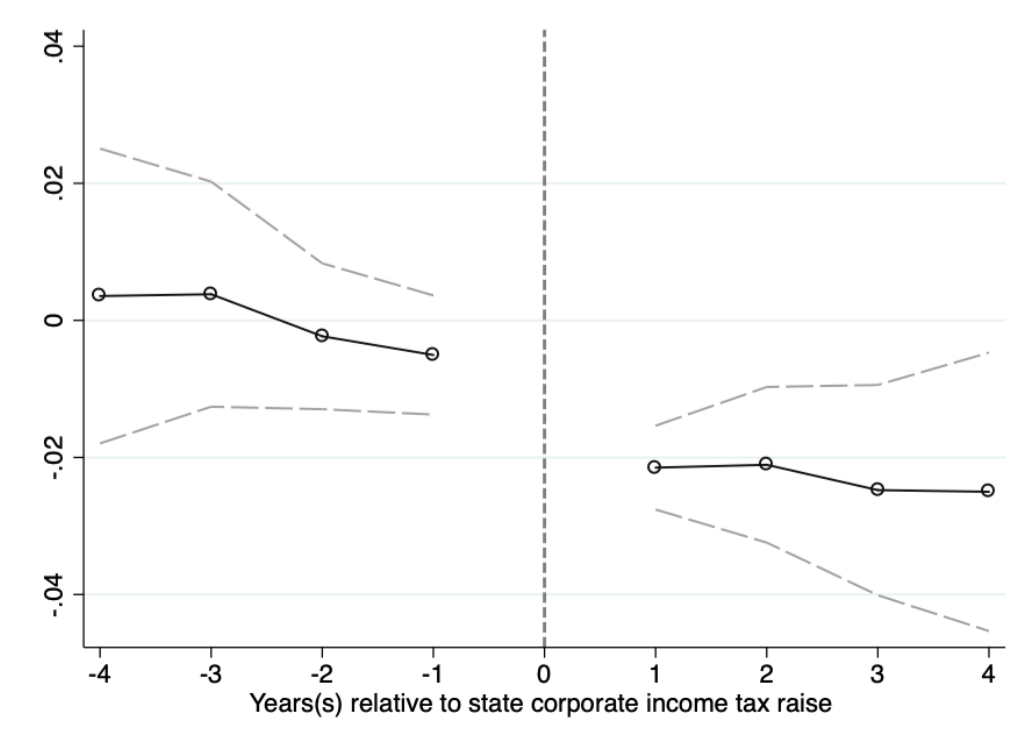


Figure 3: **Firms in New York-Newark-Bridgeport, NY-NJ-CT-PA**

This figure plots the location of firms in our sample, headquartered in the New York-Newark-Bridgeport EA. The light dash lines are the state borders.

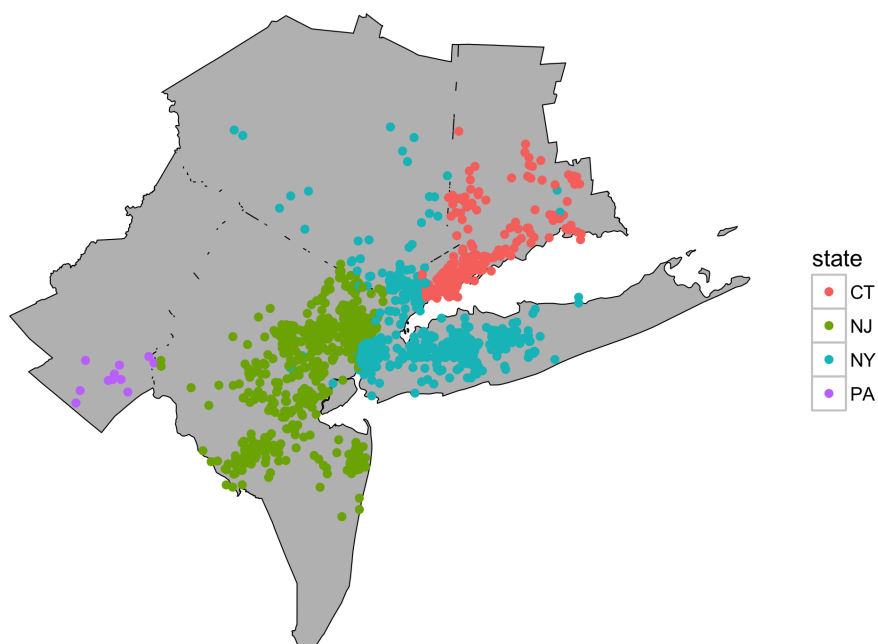


Table 1: **Summary statistics**

The sample consists of all public US companies that are traded on the NYSE, AMEX, or NASDAQ during fiscal years 1989 to 2014. The table reports summary statistics for the main variables used in the analyses. Variable definitions are provided in the Appendix A. Variables are winsorized at 0.5% in each tail.

	N	Mean	Std.Dev	25 th	Median	75 th
I^{Total}	75,858	0.227	0.202	0.107	0.171	0.274
Number of local peers	75,858	42.18	44.60	13	25	59
$\bar{I}_{-i,a,j}^{Total}$	75,858	0.229	0.0910	0.165	0.216	0.279
$\bar{I}_{a,-j}^{Total}$	75,858	0.221	0.0619	0.175	0.219	0.258
$\bar{I}_{-a,j}^{Total}$	75,858	0.224	0.0726	0.179	0.212	0.274
ΔI^{Total}	67,075	-0.0263	0.136	-0.0462	-0.00608	0.0179
$\Delta \bar{I}_{a,j}^{Total}$	66,103	-0.00557	0.0471	-0.0284	-0.00447	0.0188
$\Delta \bar{I}_{a,-j}^{Total}$	66,909	-0.00372	0.0282	-0.0201	-0.00119	0.0125
$\Delta \bar{I}_{-a,j}^{Total}$	66,692	-0.00442	0.0272	-0.0176	-0.00160	0.0103
$I^{Physical}$	75,690	0.0737	0.104	0.0181	0.0408	0.0851
$I^{Intangible}$	75,665	0.147	0.146	0.0475	0.114	0.197
$\Delta I^{Physical}$	67,081	-0.0108	0.0785	-0.0197	-0.00176	0.00981
$\Delta I^{Intangible}$	67,244	-0.0148	0.0723	-0.0189	-0.00121	0.00469
$\Delta \bar{I}_{-i,a,j}^{Physical}$	65,863	-0.00249	0.0250	-0.0137	-0.00180	0.00915
$\Delta \bar{I}_{a,-j}^{Physical}$	66,988	-0.00203	0.0146	-0.00946	-0.00128	0.00671
$\Delta \bar{I}_{-a,j}^{Physical}$	66,823	-0.00203	0.0125	-0.00879	-0.000874	0.00513
$\Delta \bar{I}_{-i,a,j}^{Intangible}$	65,846	-0.00268	0.0258	-0.0152	-0.00246	0.00852
$\Delta \bar{I}_{a,-j}^{Intangible}$	66,957	-0.00148	0.0150	-0.00953	-0.00178	0.00639
$\Delta \bar{I}_{-a,j}^{Intangible}$	66,595	-0.00187	0.0128	-0.00792	-0.000952	0.00467
Assets (in millions \$)	75,858	3,047	25,692	35.94	151.7	756.0
Total Tobin's Q	70,580	1.375	2.457	0.264	0.691	1.467
Total cashflow	74,941	0.151	0.313	0.0490	0.140	0.239

Table 2: **Firm investment and local peer investment**

This table reports the fixed effect and first-difference estimation results of firm investment on the average local peer firms' investment. The sample consists of all public US companies that are traded on the NYSE, AMEX, or NASDAQ during fiscal years 1989 to 2014. The dependent variable is total investment rate for firm i at year t , and the independent variable $I_{-i,a,j,t}^{Total}$ is the average total investment rate for all firms in the same EA a and same industry j , excluding firm i . $I_{a,-j,t}^{Total}$ is the average investment rate for firms in the same EA a and different industry j . $I_{-a,j,t}^{Total}$ is the average industry investment, excluding firms in local area a to control for the industry trend. Year, Industry, EA, and firm fixed effects are employed as indicated. Standard errors are clustered at the firm level and reported in parentheses. *, **, *** mean significance at ten, five, and one percent, respectively.

	I^{Total} (1)	ΔI^{Total} (2)
$\bar{I}_{-i,a,j}^{Total}$	0.184*** (0.021)	
$\bar{I}_{a,-j}^{Total}$	0.141*** (0.038)	
$\bar{I}_{-a,j}^{Total}$	0.751*** (0.045)	
$\Delta \bar{I}_{-i,a,j}^{Total}$		0.088*** (0.016)
$\Delta \bar{I}_{a,-j}^{Total}$		0.055* (0.029)
$\Delta \bar{I}_{-a,j}^{Total}$		0.515*** (0.036)
EA FE	✓	✓
Year FE	✓	✓
Industry FE	✓	✓
Firm FE	✓	
Observations	75,858	64,675
R-squared	0.497	0.033

Table 3: **State corporate income tax and corporate investment**

This table reports the first-difference estimation results of state corporate income tax changes on firm investment. The sample consists of all public US companies that are traded on the NYSE, AMEX, or NASDAQ during fiscal years 1989 to 2014. The dependent variable is the total investment for firm i at year t , and the independent variable is a dummy taking on the value of one if a state increases its corporate income tax and zero otherwise in the previous year $t - 1$. Firm and local control variables are added in columns (2) and (4) and defined in the Appendix A. Columns (3)-(4) only use firms located in multi-state EAs in the estimation. Coefficients are multiplied by 100. All regressions include year, EA, and industry fixed effects. Standard errors are clustered at the firm level and reported in parentheses. *, **, *** mean significance at ten, five, and one percent, respectively.

	$\Delta I_{i,t}^{Total}$			
	(1)	(2)	(3)	(4)
=1 if Corp Income Tax Rise in $t - 1$	-0.629** (0.258)	-0.628** (0.259)	-0.752** (0.319)	-0.806** (0.324)
=1 if Corp Income Tax Cut in $t - 1$	-0.350 (0.300)	-0.497* (0.280)	0.438 (0.372)	0.396 (0.329)
$\Delta \text{Cashflow}_t$		3.071*** (0.648)		2.753*** (0.989)
$\Delta \text{Tobin's } Q_{t-1}$		2.194*** (0.067)		2.036*** (0.101)
$\Delta \log(\text{Asset})_{t-1}$		-5.543*** (0.311)		-4.496*** (0.479)
=1 if Sale Tax Rise in $t - 1$		0.386* (0.197)		-0.019 (0.311)
=1 if Top Personal Income Tax Rise in $t - 1$		-0.230 (0.164)		-0.000 (0.229)
GSP growth rate $_{t-1}$		0.028 (0.022)		0.040 (0.033)
Unemployment rate $_{t-1}$		-0.135 (0.094)		0.037 (0.129)
Union penetration $_{t-1}$		-0.021 (0.072)		0.163* (0.096)
Population growth $_{t-1}$		29.512 (18.700)		42.232 (34.753)
Per capital income growth $_{t-1}$		5.975** (2.878)		1.980 (5.342)
EA FE	✓	✓	✓	✓
Industry FE	✓	✓	✓	✓
Year FE	✓	✓	✓	✓
Observations	67,319	59,291	28,802	25,476
R-squared	0.026	0.138	0.025	0.125

Table 4: **Determinants of state corporate income tax rises**

This table evaluates determinants of state corporate income tax rises. Column (1) reports the summary statistics of the determinant variables, showing means and standard deviations in parentheses. Columns (2) - (4) report OLS regression results. The dependent variable in these regressions is a dummy variable, taking on the value of 1 if a state increases corporate income tax in year t and 0 otherwise. The explanatory variables (Δ) Home state I_{t-1} is the state aggregate level (growth) of total investment in the last year, and (Δ) neighboring state I_{t-1} is the aggregate level (growth) of investment of the home state's neighboring states in the last year. Other variables are defined in the Appendix A and Heider and Ljungqvist (2015). All regressions include state and year fixed effect. Standard errors are clustered at the state level and reported in parentheses. *, **, *** mean significance at ten, five, and one percent, respectively.

	Sum.Stat.	= 1 if tax rise		
	(1)	(2)	(3)	(4)
Home state I_{t-1}	0.120 (0.051)	-0.083 (0.140)		
Neighboring state I_{t-1}	0.110 (0.027)	-1.100 (0.711)		
Δ Home state I_{t-1}	0.007 (0.025)		0.132 (0.137)	
Δ Neighboring state ΔI_{t-1}	0.006 (0.012)		-0.295 (0.617)	
Neighboring state TaxInc $_{t-1}$	0.126 (0.332)			0.006 (0.025)
Neighboring state TaxCut $_{t-1}$	0.268 (0.443)			0.002 (0.012)
=1 if Democratic governor in year t-1	0.465 (0.499)	0.001 (0.014)	-0.001 (0.015)	-0.005 (0.014)
=1 if 1 year to next gubernatorial election		0.042** (0.020)	0.042** (0.020)	0.033 (0.021)
=1 if 2 year to next gubernatorial election		0.008 (0.011)	0.010 (0.011)	0.013 (0.011)
=1 if 3 year to next gubernatorial election		0.075*** (0.027)	0.074*** (0.027)	0.065*** (0.024)
state budget balance	0.019 (0.068)	-0.187 (0.161)	-0.158 (0.156)	-0.196 (0.131)
GSP growth rate	2.728 (2.866)	-0.001 (0.002)	-0.001 (0.002)	0.001 (0.002)
state unemployment rate	5.499 (1.829)	-0.001 (0.004)	0.002 (0.004)	-0.001 (0.005)
state union penetration	8.583 (4.409)	0.001 (0.006)	-0.000 (0.006)	0.004 (0.006)
Tax competition (in year t-1)	-2.471 (3.130)	-0.014*** (0.005)	-0.016*** (0.005)	-0.017*** (0.005)
=1 if Sale Tax Rise		0.115*** (0.037)	0.116*** (0.037)	0.108*** (0.035)
=1 if Top Personal Income Tax Rise		0.165*** (0.050)	0.164*** (0.050)	0.163*** (0.054)
Year FE		✓	✓	✓
State FE		✓	✓	✓
Observations		1,174	1,171	1,248
R-squared		0.192	0.192	0.178

Table 5: **The impact of local peers on corporate investment**

This table reports 2SLS (Panel A and B) regression results using first-difference estimations. The sample contains publicly traded U.S. firms located in an EA that spans more than one state. The dependent variable is the total investment for firm i at year t . The endogenous variable is the average investment rate for all firms in the same EA and industry, excluding firm i . The excluded instrument variables in column (1) are the fraction of local peers affected by state tax increase, and columns (2)/(3) are the predicted changes in the state-specific/state-industry-specific leave-out mean of the investment rate based on a firm-level regression of the change in investment rate on a tax rise dummy. Year, industry and EA fixed effects are included in each specification. We report the F-statistics corresponding to the first-stage Kleibergen-Paap Wald test. Standard errors are clustered at the firm level and reported in parentheses. *, **, *** mean significance at ten, five, and one percent, respectively.

Panel A: Second stage

	(1)	ΔI_i^{Total} (2)	(3)
$\Delta \bar{I}_{-i,a,j}^{total}$	0.772*** (0.285)	0.829*** (0.290)	1.082*** (0.327)
Observations	28,066	28,067	28,068

Panel B: First stage

Fraction of local peers affected by tax increase	-0.017*** (0.002)		
Predicted state-specific $\Delta \bar{I}_{-i,a,j}^{total}$		0.842*** (0.058)	
Predicted state-industry-specific $\Delta \bar{I}_{-i,a,j}^{total}$			0.681*** (0.040)
Year FE	✓	✓	✓
Industry FE	✓	✓	✓
EA FE	✓	✓	✓
Observations	28,066	28,066	28,066
R-squared	0.325	0.326	0.327
Kleibergen-Paap Wald F-stats.	130.4	211.7	283.3

Table 6: **Robustness: Indirect tax spillovers**

This table reports second-stage results from 2SLS regressions using first-difference estimations. The sample contains publicly traded U.S. firms located in an EA that spans more than one state. The dependent variable is the total investment for firm i at year t . The endogenous variable is the average investment rate for all firms in the same EA and industry, excluding firm i . Columns (1) and (2) exclude firm i 's major customers in forming local peer portfolio, and columns (3)-(4) exclude firms with subsidiaries in corporate tax affected states. The excluded instrument variables are the predicted changes in the state-specific/state-industry-specific leave-out mean of the investment rate based on a firm-level regression of the change in investment rate on a tax rise dummy. All regressions include year, industry and EA fixed effects. We report the F-statistics corresponding to the first-stage Kleibergen-Paap Wald test. Standard errors are clustered at the firm level and reported in parentheses. *, **, *** mean significance at ten, five, and one percent, respectively.

	(1)	(2)	(3)	(4)
	ΔI^{Total}			
	Exclude major consumers in portfolio		Exclude firms with subsidiaries in taxed states	
$\Delta \bar{I}_{-i,a,j-customer}^{total}$	0.833*** (0.279)	1.060*** (0.300)		
$\Delta \bar{I}_{-i,a,j}^{total}$			1.650** (0.809)	1.906** (0.750)
Year FE	✓	✓	✓	✓
Industry FE	✓	✓	✓	✓
EA FE	✓	✓	✓	✓
Observations	27,969	27,969	16,838	16,838
Kleibergen-Paap Wald F-stats.	228.5	390.6	71.15	246.4

Table 7: **Robustness: Local expansion opportunities**

This table reports OLS results examining neighboring state corporate tax increases on firm investment. The sample contains publicly traded U.S. firms located in an EA that spans more than one state. The dependent variable is the total investment for firm i at year t . The independent variable *Neighbor_TaxInc* equals to one if a firms neighboring states increase state corporate taxes and zero otherwise. *less_opp_n* and *less_opp_size* are two dummy variables proxy for neighboring expansion opportunities based on the number or size of tax-unaffected states within an EA. All regressions include year, industry and EA fixed effects. Standard errors are clustered at the firm level and reported in parentheses. *, **, *** mean significance at ten, five, and one percent, respectively.

	(1)	(2) ΔI^{Total}	(3)
<i>Neighbor_TaxInc</i>	-0.004*	-0.006**	-0.005
	(0.003)	(0.003)	(0.004)
<i>Neighbor_TaxInc</i> $\times$ <i>less_opp_n</i>		0.009	
		(0.006)	
<i>less_opp_n</i>		-0.004	
		(0.003)	
<i>Neighbor_TaxInc</i> $\times$ <i>less_opp_size</i>			0.003
			(0.005)
<i>less_opp_size</i>			-0.004
			(0.003)
Year FE	✓	✓	✓
Industry FE	✓	✓	✓
EA FE	✓	✓	✓
Observations	28,802	28,802	28,802
R-squared	0.025	0.025	0.025

Table 8: **Robustness: Local demand shocks**

This table reports second-stage results from 2SLS regressions using first-difference estimations. The sample contains publicly traded U.S. firms located in an EA that spans more than one state. Panel A compares local peer effect for tradable and non-tradable industries; Panel B excludes observations affected by increase of sales tax or personal income tax. The dependent variable is the total investment for firm i at year t . The endogenous variable is the average investment rate for all firms in the same EA and industry, excluding firm i . The excluded instrument variables are the predicted changes in the state-specific/state-industry-specific leave-out mean of the investment rate based on a firm-level regression of the change in investment rate on a tax rise dummy. All regressions include year, industry and EA fixed effects. We report the F-statistics corresponding to the first-stage Kleibergen-Paap Wald test. Standard errors are clustered at the firm level and reported in parentheses. *, **, *** mean significance at ten, five, and one percent, respectively.

Panel A: Tradable and nontradable industries

				ΔI^{Total}	
				(1)	(2)
				(3)	(4)
$\Delta \bar{I}_{-i,a,j}$ * nontradable1				0.004 (0.543)	-0.349 (0.507)
$\Delta \bar{I}_{-i,a,j}$ * nontradable2					-0.704 (0.767)
$\Delta \bar{I}_{-i,a,j}$				0.766** (0.337)	1.104*** (0.367)
Year FE				✓	✓
Industry FE				✓	✓
EA FE				✓	✓
Observations				26,844	26,844
Kleibergen-Paap Wald F-stats.				97.78	144.3
					26,844
					11.19
					4.822

Panel B: Excluding other local taxes affected sample

				Exclude sales tax increase	
				Exclude personal income tax increase	
$\Delta \bar{I}_{-i,a,j}^{total}$				0.955*** (0.346)	1.079*** (0.351)
Year FE				✓	✓
Industry FE				✓	✓
EA FE				✓	✓
Observations				26,775	26,775
Kleibergen-Paap Wald F-stats.				121.8	146.9
					24,829
					143.4
					303.5

Table 9: **Robustness: Fixed effect model**

This table reports the second-stage results using fixed effect model. The sample contains publicly traded U.S. firms located in an EA that spans more than one state. We further restrict the sample to the years within five years after the state increased or reduced corporate tax. The dependent variable is the total investment for firm i at year t . The endogenous variable is the average investment rate for all firms in the same EA and industry, excluding firm i . The excluded instrument variables in column (1) are the fraction of local peers affected by state tax increase, and columns (2)/(3) are the predicted level in the state-specific/state-industry-specific leave-out mean of the investment rate based on a firm-level fixed effect model. Year, industry, EA, and firm fixed effects are included in each specification. We report the F-statistics corresponding to the first-stage Kleibergen-Paap Wald test. Standard errors are clustered at the firm level and reported in parentheses. *, **, *** mean significance at ten, five, and one percent, respectively.

	(1)	(2) I^{Total}	(3)
$\Delta \bar{I}_{-i,a,j}^{total}$	1.930*** (0.746)	2.052*** (0.669)	2.233*** (0.765)
Year FE	✓	✓	✓
Industry FE	✓	✓	✓
EA FE	✓	✓	✓
Firm FE	✓	✓	✓
Observations	23,074	22,610	22,610
Kleibergen-Paap Wald F-stats.	19.61	26.26	21.93

Table 10: **The impact of local peers on physical and intangible investment**

This table reports first- (Panel B) and second-stage (Panel A) regression results from a 2SLS regression using first differences. The sample contains publicly traded U.S. firms located in an EA that spans more than one state. The dependent variable is the investment rate in physical (columns 1-3) and intangible (columns 4-6) capital for firm i at year t . The excluded instrument variables in columns (1) and (4) are the fraction of local peers affected by state tax increase, and in columns (2)/(3) and (5)/(6) are the predicted changes in the state-specific/state-industry-specific leave-out mean of the investment rate based on a firm-level regression of the change in investment rate on a tax rise dummy. All regressions include year, industry, and EA fixed effects. We report the F-statistics corresponding to the first-stage Kleibergen-Paap Wald test. Standard errors are clustered at the firm level and reported in parentheses. *, **, *** mean significance at ten, five, and one percent, respectively.

Panel A: Second stage

	$\Delta I_i^{Physical}$			$\Delta I_i^{Intangible}$		
	(1)	(2)	(3)	(4)	(5)	(6)
$\Delta \bar{I}_{-i,a,j}$	0.473** (0.236)	0.628*** (0.235)	0.908*** (0.245)	0.869** (0.425)	0.842* (0.432)	1.236** (0.517)
Observations	28,090	28,090	28,090	28,010	28,010	28,010

Panel B: First stage

Fraction of local peers affected by tax increase	-0.012*** (0.001)			-0.007*** (0.001)		
Predicted state-specific $\Delta \bar{I}_{-i,a,j}$		1.351*** (0.106)			0.750*** (0.066)	
Predicted state-industry-specific $\Delta \bar{I}_{-i,a,j}$			1.072*** (0.053)			0.541*** (0.031)
Year FE	✓	✓	✓	✓	✓	✓
Industry FE	✓	✓	✓	✓	✓	✓
EA FE	✓	✓	✓	✓	✓	✓
Observations	28,090	28,090	28,090	28,010	28,010	28,010
R-squared	0.0559	0.0567	0.0642	0.113	0.115	0.117
Kleibergen-Paap Wald F-stats.	151.6	161.7	403.8	40.63	128.1	303.2

Table 11: **The cross-type local peer effects**

This table presents the second-stage results from 2SLS regressions using first-difference estimations to analyze cross-type peer effects in investment rates. The sample includes publicly traded U.S. firms located in EAs spanning multiple states. Panel A focuses on the investment rates in physical and intangible capital as dependent variables. The excluded instruments in columns (1)/(2) and (3)/(4) are the predicted changes in the state-specific and state-industry-specific leave-out mean of the investment rate, respectively, derived from a firm-level regression of the change in investment rate on a tax increase dummy. Panel B splits the sample based on the median firm-level intangible intensity, which serves as a proxy for whether firms primarily rely on intangible or physical capital as their operational strategy. The excluded instrument is the predicted change in the state-industry-specific leave-out mean of the investment rate. All regressions include year, industry, and EA fixed effects to control for time-invariant heterogeneity. The F-statistics from the first-stage Kleibergen-Paap Wald test are reported. Standard errors are clustered at the firm level and reported in parentheses. *, **, *** mean significance at ten, five, and one percent, respectively.

Panel A: Cross-type peer effect

	$\Delta I_i^{Physical}$		$\Delta I_i^{Intangible}$	
	(1)	(2)	(3)	(4)
$\Delta \bar{I}_{-i,a,j}^{physical}$	0.774*** (0.292)	0.899*** (0.269)	-0.441 (0.478)	-0.065 (0.224)
$\Delta \bar{I}_{-i,a,j}^{intangible}$	-0.115 (0.197)	-0.012 (0.165)	1.073* (0.576)	1.260*** (0.486)
Year, Industry, EA FE	✓	✓	✓	✓
Observations	27,552	27,552	27,492	27,492
Kleibergen-Paap Wald F-stats.	48.91	160.7	49.30	163.8

Panel B: Cross-type peer effect and operational strategy

	$\Delta I_i^{Physical}$		$\Delta I_i^{Intangible}$	
	Primary operational strategy			
	Intangible	Physical	Intangible	Physical
$\Delta \bar{I}_{-i,a,j}^{physical}$	-0.101 (0.179)	1.433*** (0.404)	-0.080 (0.614)	0.225 (0.148)
$\Delta \bar{I}_{-i,a,j}^{intangible}$	0.149 (0.179)	0.058 (0.314)	1.956** (0.792)	0.269* (0.152)
Year, Industry, EA FE	✓	✓	✓	✓
Observations	14,455	13,038	14,353	13,082
Kleibergen-Paap Wald F-stats.	50.48	52.52	49.14	53.65

Table 12: **Potential channels: signal precision and knowledge spillover**

This table reports second-stage results from 2SLS regressions using first-difference estimations. The sample contains publicly traded U.S. firms located in an EA that spans more than one state. Panel A and B report the local peer effects for physical and investment investment, respectively. *Above* is an indicator variable taking on the value of 1 if firm equity/ROA volatility is above the median value of local peer firms in columns (1)/(2); if the firm's industry-level R&D stock ratio is above the median value in column (3); if a firm's local share of industry-year R&D stock, excluding itself, is above the median value in column (4). We interact the indicator with the leave-out of the corresponding investment rate across all firms in an EA and industry in year t . The excluded instrument is the predicted change in the state-industry-specific leave-out mean of the investment rate based on a firm-level regression of the change in investment rate on a tax rise dummy. All regressions include year, industry and EA fixed effects. We report the F-statistics corresponding to the first-stage Kleibergen-Paap Wald test. Standard errors are clustered at the firm level and reported in parentheses. *, **, *** mean significance at ten, five, and one percent, respectively.

Panel A: Physical investment

	(1) Signal precision Equity vol	(2) ROA vol	(3) Knowledge spillover Industry R&D stock ratio	(4) Local- industry R&D stock ratio
$\Delta I_i^{Physical}$				
$Above \times \Delta \bar{I}_{-i,a,j}^{Physical}$	0.914*** (0.298)	1.928*** (0.670)	-0.906 (0.968)	-0.463 (0.646)
$\Delta \bar{I}_{-i,a,j}^{Physical}$	0.497*** (0.147)	0.112 (0.223)	1.474** (0.728)	0.818** (0.399)
Year, Industry, EA FE	✓	✓	✓	✓
Observations	27,929	27,654	28,090	22,359
Kleibergen-Paap Wald F-stats.	10.34	10.87	16.16	8.240

Panel B: Intangible investment

$\Delta I_i^{Intangible}$				
$Above \times \Delta \bar{I}_{-i,a,j}^{Intangible}$	-0.060 (0.641)	0.561 (0.374)	0.815* (0.456)	1.244*** (0.387)
$\Delta \bar{I}_{-i,a,j}^{Intangible}$	1.243*** (0.386)	0.673*** (0.154)	0.506 (0.457)	0.517** (0.244)
Year, Industry, EA FE	✓	✓	✓	✓
Observations	27,854	27,598	28,010	22,241
Kleibergen-Paap Wald F-stats.	10.51	10.44	11.58	13.58

A Variable definition

Firm-level characteristics

$I^{Physical}$ is the physical investment rate, constructed by scaling a firm's capital expenditure (capx) by its total capital K^{Total} in the previous year, where K^{Total} is the sum of the replacement cost of physical capital (ppeg) and intangible capital (the sum of a firm's externally purchased and internally created intangible capital estimated by Peters and Taylor (2017)).

$I^{Intangible}$ is the intangible investment rate, constructed by scaling a firm's intangible investment, as research and development (R&D) plus 30% of selling, general and administrative (SG&A) expense, by the total capital in the previous year.

I^{Total} is the total investment rate, measured as the sum of $I^{Physical}$ and $I^{Intangible}$.

$\bar{I}_{-i,a,j}$ is the average investment of a firm i 's local peers in the same EA a and industry j , excluding firm i .

$\bar{I}_{a,-j}$ is the average investment of firms in the same EA a and different industries.

$\bar{I}_{-a,j}$ is the average industry investment rates, excluding firms in the area a .

Total Tobin's Q is calculated as $(dltt + dlc + csho \times prcc.f - act)/(ppeg + \text{intangible capital})$, where intangible capital is estimated by Peters and Taylor (2017).

Total cashflow is calculated $(ib + dp + (xrd + 0.3 \times sga) \times (1-0.3))/1.(ppeg + \text{intangible capital})$, where intangible capital is estimated by Peters and Taylor (2017).

$\log(\text{Asset})$ is defined as the natural logarithm of firm book value of assets (at).

State-level characteristics

GSP growth rate is the annual growth rate of gross state product (GSP), obtained from the U.S. Bureau of Economic Analysis.

Unemployment rate is the state unemployment rate, obtained from the U.S. Bureau of Labor Statistics.

Population growth rate is the annual growth rate of population in an EA, aggregated based on county-level statistics from Census.

Per capita income growth is the annual per capita income growth rate in an EA, aggregated based on county-level statistics from Census.

State union penetration is the fraction of private-sector employees in a state who belong to a labor union in year t . The data come from Hirsch and Macpherson (2003) as updated on their website, <http://www.unionstats.com>.

State budget balance equals the difference between a states general revenues and its general expenditures scaled by its general expenditures, from the U.S. Census Bureaus State & Local Finances database.

Tax competition is defined as the difference between a states corporate income tax rate and the highest corporate income tax rate levied by any of the neighboring states.

Home state I is the state aggregate total investment.

Neighboring state I is the neighboring states aggregate total investment.

Table A. 1: **Sample construction and two-sample t-test**

Panel A of the table reports the number of firms during the procedure of sample construction. Panel B compares the summary statistics for the full sample and sub-sample that contains firms located in multi-state EAs.

Panel A: Number of firms in sample construction							
Number of all firms located in the U.S. with non-missing total investment	11,376	100%					
Number of firms with less than five local peers	9,099	80%					
Number of firms located in a multi-state EA	3,871	31%					
Panel B: Summary statistics for subsample							
	N	Mean	Std.Dev	N	Mean	Std.Dev	Difference
Assets (in millions \$)	75,858	3,047	25,692	32,389	4,236	34,176	-1189***
Total investment (I^{Total})	75,858	0.227	0.202	32,389	0.219	0.191	0.008***
Physical investment ($I^{Physical}$)	75,690	0.0737	0.104	32,351	0.0644	0.0902	0.0093***
Intangible investment ($I^{Intangible}$)	75,665	0.147	0.146	32,302	0.150	0.141	-0.003***
Total cashflow	74,941	0.151	0.313	31,860	0.158	0.318	-0.007***
Total Tobin's Q	70,580	1.375	2.457	29,954	1.371	2.500	0.004
Number of local peers	75,858	42.18	44.60	32,389	40.46	31.17	1.72***
ΔI^{Total}	67,075	-0.0263	0.136	28,755	-0.0233	0.127	-0.003***
$\Delta I^{Physical}$	67,081	-0.0108	0.0785	28,795	-0.00882	0.0704	-0.00198***
$\Delta I^{Intangible}$	67,244	-0.0148	0.0723	28,799	-0.0141	0.0714	-0.001
$\Delta \bar{I}_{-i,a,j}^{Total}$	66,103	-0.00557	0.0471	28,566	-0.00494	0.0422	-0.001*
$\Delta \bar{I}_{a,-j}^{Total}$	66,909	-0.00372	0.0282	28,835	-0.00358	0.0248	0.000
$\Delta \bar{I}_{-a,j}^{Total}$	66,692	-0.00442	0.0272	28,499	-0.00376	0.0272	-0.001
$\Delta \bar{I}_{-i,a,j}^{Physical}$	65,863	-0.00249	0.0250	28,508	-0.00232	0.0212	0.000
$\Delta \bar{I}_{a,-j}^{Physical}$	66,988	-0.00203	0.0146	28,763	-0.00204	0.0126	0.000
$\Delta \bar{I}_{-a,j}^{Physical}$	66,823	-0.00203	0.0125	28,589	-0.00197	0.0116	0.000
$\Delta \bar{I}_{-i,a,j}^{Intangible}$	65,846	-0.00268	0.0258	28,482	-0.00275	0.0249	0.000
$\Delta \bar{I}_{a,-j}^{Intangible}$	66,957	-0.00148	0.0150	28,826	-0.00145	0.0129	0.000
$\Delta \bar{I}_{-a,j}^{Intangible}$	66,595	-0.00187	0.0128	28,547	-0.00148	0.0134	0.000***

Table A. 2: **Subsample: Firm investment and local peer investment**

This table reports the fixed effect and first-difference estimation results of firm investment on the average local peer firms' investment. The sample contains publicly traded U.S. firms located in an EA that spans more than one state. The dependent variable is total investment rate for firm i at year t , and the independent variable $I_{-i,a,j,t}^{Total}$ is the average total investment rate for all firms in the same EA a and same industry j , excluding firm i . $I_{a,-j,t}^{Total}$ is the average investment rate for firms in the same EA a and different industry j . $I_{-a,j,t}^{Total}$ is the average industry investment, excluding firms in local area a to control for the industry trend. Year, Industry, EA, and firm fixed effects are employed as indicated. Standard errors are clustered at the firm level and reported in parentheses. *, **, *** mean significance at ten, five, and one percent, respectively.

	(1) I^{Total}	(2) ΔI^{Total}
$\bar{I}_{-i,a,j}^{Total}$	0.160*** (0.034)	
$\bar{I}_{a,-j}^{Total}$	0.093 (0.069)	
$\bar{I}_{-a,j}^{Total}$	0.598*** (0.062)	
$\Delta \bar{I}_{a,j}^{Total}$		0.072*** (0.025)
$\Delta \bar{I}_{a,-j}^{Total}$		0.038 (0.052)
$\Delta \bar{I}_{-a,j}^{Total}$		0.418*** (0.051)
EA FE	✓	✓
Year FE	✓	✓
Industry FE	✓	✓
Firm FE	✓	
Observations	32,336	28,066
R-squared	0.509	0.028

Table A. 3: **State corporate income tax and total investment: FE model**

This table reports the fixed-effect estimation results of state corporate income tax changes on firm total investment. The sample consists of all public US companies that are traded on the NYSE, AMEX, or NASDAQ during fiscal years 1989 to 2014 in columns (1)-(2), and those located in multi-state EAs in columns (3)-(4). We identify the first corporate tax change in each state during our sample period and restrict the sample to the years within five years after the state increased or reduced corporate tax. The dependent variable is the total investment for firm i , and the independent variables are dummy variables taking on the value of one after the state increases/cuts its corporate income tax and zero otherwise. All regressions include year, EA, industry, and firm fixed effects. Standard errors are clustered at the firm level and reported in parentheses. *, **, *** mean significance at ten, five, and one percent, respectively.

	(1)	(2)	(3)	(4)
	$I_{i,t}^{Total}$			
=1 if after 1st Corp Income Tax Rise	-0.045*** (0.006)	-0.031*** (0.005)	-0.018*** (0.007)	-0.021** (0.009)
=1 if after 1st Corp Income Tax Cut	0.003 (0.002)	0.000 (0.002)	0.008** (0.003)	0.006** (0.003)
Control variables		✓		✓
Year FE	✓	✓	✓	✓
Industry FE	✓	✓	✓	✓
EA FE	✓	✓	✓	✓
Firm FE	✓	✓	✓	✓
Observations	59,660	51,955	23,099	19,719
R-squared	0.504	0.618	0.524	0.629

Table A. 4: **Robustness checks: Different samples**

This table reports second stage regression results from 2SLS regression with different samples. Firms located in the largest 20 EAs are used in the column (1) to (3). We use metropolitan statistical areas (MSAs) instead of EAs as local areas to construct local peers in columns (4) to (6). Local peers are defined as firms in the same three-digit SIC and the same EA in columns (7) and (9). The excluded instrument variables in column (1)/(4)/(7) are the fraction of local peers affected by state tax increase, and columns (2)/(5)/(8) or (3)/(6)/(9) are the predicted changes in the state-specific or state-industry-specific leave-out mean of the investment rate based on a firm-level regression of the change in investment rate on a tax rise dummy. All regressions include year, EA, and industry fixed effects. Standard errors are clustered at the firm level and *, **, *** mean significance at ten, five, and one percent, respectively.

	EA20			MSA			SIC3		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
$\Delta \bar{I}_{-i,a,j}^{Total}$	0.821** (0.342)	0.910*** (0.340)	1.214*** (0.383)	1.014* (0.551)	0.781** (0.353)	1.005*** (0.381)	1.139*** (0.441)	1.055** (0.460)	1.119*** (0.368)
Year FE	✓	✓	✓	✓	✓	✓	✓	✓	✓
Industry FE	✓	✓	✓	✓	✓	✓	✓	✓	✓
EA FE	✓	✓	✓	✓	✓	✓	✓	✓	✓
Observations	25,963	25,963	25,963	19,193	19,193	19,193	12,363	12,363	12,363
Kleibergen-Paap Wald F-stats.	123	191.3	273.9	38.28	178.1	253.5	38.81	53.51	92.97

Table A. 5: **Robustness checks: With firm- and local-controls**

This table reports the second-stage regression results using first-difference estimations with control variables. The sample contains publicly traded U.S. firms located in an EA that spans more than one state. The dependent variable is the total investment for firm i at year t . The endogenous variable is the average investment rate for all firms in the same EA and industry, excluding firm i . The excluded instrument variables in column (1) are the fraction of local peers affected by state tax increase, and columns (2)/(3) are the predicted changes in the state-specific/state-industry-specific leave-out mean of the investment rate based on a firm-level regression of the change in investment rate on a tax rise dummy. Firm and local control variables, year, industry and EA fixed effects are included in each specification. We report the F-statistics corresponding to the first-stage Kleibergen-Paap Wald test. Standard errors are clustered at the firm level and reported in parentheses. *, **, *** mean significance at ten, five, and one percent, respectively.

	(1)	ΔI_i^{Total} (2)	(3)
$\Delta \bar{I}_{-i,a,j}^{total}$	0.768** (0.321)	0.684** (0.306)	0.890*** (0.295)
Firm and local controls	✓	✓	✓
Year FE	✓	✓	✓
Industry FE	✓	✓	✓
EA FE	✓	✓	✓
Observations	24,846	24,846	24,846
Kleibergen-Paap Wald F-stats.	74.76	151.2	231.9

Table A. 6: **Robustness checks: Different clustering**

This table reports second stage regression results from 2SLS regression with different clustering for standard errors. The endogenous variable is the average total investment rate for all firms in the same EA and industry, excluding firm i . The excluded instrument variables in column (1)/(4)/(7) are the fraction of local peers affected by state corporate tax increase, and columns (2)/(5)/(8) or (3)/(6)/(9) are the predicted changes in the state-specific or state-industry-specific leave-out mean of the investment rate based on a firm-level regression of the change in investment rate on a tax increase dummy. We report the F-statistics corresponding to the first-stage Kleibergen-Paap Wald test. Standard errors are clustered at EA, industry, and double clustering at EA and industry level as indicated, reported in parentheses. *, **, *** mean significance at ten, five, and one percent, respectively.

	ΔI^{Total}								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
$\Delta \bar{I}_{-i,a,j}^{Total}$	0.772*** (0.116)	0.829*** (0.141)	1.082*** (0.146)	0.772*** (0.227)	0.829*** (0.158)	1.082*** (0.178)	0.772*** (0.224)	0.829*** (0.207)	1.082*** (0.170)
Clustering	EA	EA	EA	Industry	Industry	Industry	EA, Industry	EA, Industry	EA, Industry
Year FE	✓	✓	✓	✓	✓	✓	✓	✓	✓
Industry FE	✓	✓	✓	✓	✓	✓	✓	✓	✓
EA FE	✓	✓	✓	✓	✓	✓	✓	✓	✓
Observations	28,066	28,066	28,066	28,066	28,066	28,066	28,066	28,066	28,066
Kleibergen-Paap Wald F-stats.	13.50	28.44	39.08	3.195	5.903	22.88	9.645	16.37	28.19

Table A. 7: **State corporate income tax on physical and intangible investment**

This table reports the first-difference estimation results of state corporate income tax changes on firm physical and intangible investment. The sample consists of all public US companies that are traded on the NYSE, AMEX, or NASDAQ during fiscal years 1989 to 2014, and are located in multi-state EAs. The dependent variable is the growth rate of investment for firm i , and the independent variable is a dummy taking on the value of one if the state increases its corporate income tax and zero otherwise. All regressions include year, EA, and industry fixed effects. Standard errors are clustered at the firm level and reported in parentheses. *, **, *** mean significance at ten, five, and one percent, respectively.

	$\Delta I^{Physical}$ (1)	$\Delta I^{Intangible}$ (2)
=1 if Corp Income Tax Rise in t-1	-0.346** (0.172)	-0.375* (0.219)
=1 if Corp Income Tax Cut in t-1	-0.005 (0.185)	0.389** (0.192)
Control Variables	✓	✓
EA FE	✓	✓
Industry FE	✓	✓
Year FE	✓	✓
Observations	25,505	25,482
R-squared	0.071	0.111

Table A. 8: **Robustness checks: The cross impact of local peer effects - SIC3**

This table reports second-stage results from 2SLS regressions using first-difference estimations. The local peers are defined as firms in the same EA and the same three-digit SIC industry. The sample contains publicly traded U.S. firms located in an EA that spans more than one state. The dependent variables are the investment rate in physical and intangible capital as indicated. The excluded instrument column (1)/(2) and (3)/(4) is the predicted changes in the state-specific/state-industry-specific leave-out mean of the investment rate based on a firm-level regression of the change in investment rate on a tax rise dummy. All regressions include year, industry and EA fixed effects. We report the F-statistics corresponding to the first-stage Kleibergen-Paap Wald test. Standard errors are clustered at the firm level and reported in parentheses. *, **, *** mean significance at ten, five, and one percent, respectively.

	$\Delta I_i^{Physical}$		$\Delta I_i^{Intangible}$	
	(1)	(2)	(3)	(4)
$\Delta \bar{I}_{-i,a,j}^{Physical}$	1.638*	1.231**	0.677	0.387
	(0.948)	(0.515)	(1.169)	(0.657)
$\Delta \bar{I}_{-i,a,j}^{Intangible}$	-0.082	0.084	1.239	1.256**
	(0.264)	(0.173)	(0.814)	(0.604)
Year FE	✓	✓	✓	✓
Industry FE	✓	✓	✓	✓
EA FE	✓	✓	✓	✓
Observations	11,561	11,561	11,517	11,517
Kleibergen-Paap Wald F-stats.	4.830	19.51	4.811	19.48